Project README: Object Labeling & Mesh Retrieval

1. get_object_labels.py

Description:

Uses the Moondream2 Vision-Language Model to identify individual objects in an image. It connects to an image path and prompts the model to return a comma-separated list of object names.

How to Run:

```
python get_object_labels.py
```

Inputs:

- IMAGE_PATH: Path to the source RGB image.
- MODEL_ID: 'vikhyatk/moondream2'.

Outputs:

- labels.txt: A plain text file containing the detected object names (one per line).
- Prints detected labels to the terminal.

2. get_object_meshes.py

Description:

Downloads 3D meshes for objects listed in labels.txt by matching them against the Objaverse LVIS taxonomy. It downloads .glb files and converts them to .obj format.

How to Run:

```
python get_object_meshes.py
```

Inputs:

- labels.txt: Generated by the detection script.
- Objaverse LVIS annotations (downloaded automatically).

Outputs:

- ./objects/ folder: Contains subdirectories for each label with up to 5 .obj mesh files.

3. get_object_meshes_xl.py

Description:

A more extensive version of the mesh retrieval script that queries the Objaverse-XL dataset (10M+ objects) using metadata matching. It handles multiple file types (.glb, .fbx, etc.) and unifies them into .obj files.

How to Run:

```
python get_object_meshes_xl.py
```

Inputs:

- labels.txt: Target labels for search.
- Objaverse-XL metadata (downloaded on first run).

Outputs:

- ./objects_xl/ folder: Contains categorized .obj files retrieved from the XL dataset.

4. get_objects_labels_and_meshes.py

Description:

Combines the labeling and LVIS mesh retrieval into a single execution flow. It also manually appends 'computer' and 'monitor' to the detected label list.

How to Run:

```
python get_objects_labels_and_meshes.py
```

Inputs:

- Input Image: Specified in script config.
- Moondream2 Model access.

Outputs:

- labels.txt: The final processed list of labels.
- ./objects/ folder: Mesh files for all detected and added labels.

5. get_objects_labels_and_meshes_xl.py

Description:

An end-to-end pipeline that detects objects using Moondream2 and immediately retrieves high-scale 3D data from Objaverse-XL based on those detections.

How to Run:

```
python get_objects_labels_and_meshes_xl.py
```

Inputs:

- Input Image: Target for vision analysis.
- GPU (CUDA) is recommended for model inference speed.

Outputs:

- ./objects_xl/ folder: High-volume 3D mesh assets organized by label name.